

Gene name: O1-180

cDNA sequence: 1276 bp

“AAGGCGGGCGAGGCGCGGGACGCACCCATGTTCCCGGCGAG
CACGTTCCACCCCTGCCCCGCATCCTTATCCGCAGGCCACCAAAGCCGGGGATG
GCTGGAGGTTTCGGAGCCAGGGGCTGCCGACCCGCGCCCCCTCCTTCCTCCCC
GGCTACAGACAGCTCATGGCCGCGGAGTACGTTCGACAGCCACCAGCGGGCAC
AGCTCATGGCCCTGCTGTCGCGGATGGGTCCCCGGTCGGTCAGCAGCCGTGA
CGCTGCGGTGCAGGTGAACCCGCGCCGCGACGCCTCGGTGCAGTGTTCACTC
GGGCGCCGCACGCTGCAGCCTGCAGGGTGCCGAGCCAGCCCCGACGCCCCGAT
CGGGTTCCTGTCAACCCCGTGGCCACGCCGGCGCCGGGAGATCCCCGCGATC
CTGGCAGACCGTAGCCCCGTTCTCGTCCGTGACCTTCTGTGGCCTCTCCTCCTC
ACTGGAGGTTGCGGGAGGCAGGCAGACACCCACGAAGGGAGAGGGGAGCCC
GGCATCCTCGGGGACCCGGGAACCGGAGCCGAGAGAGGTGGCCGCGAGGAA
AGCGGTCCCCCAGCCGCGAAGCGAGGAGGGCGATGTTTCAGGCTGCAGGGCA
GGCCGGGTGGGAGCAGCAGCCACCACCGGAGGACCGGAACAGTGTGGCGGC
GATGCAGTCTGAGCCTGGGAGCGAGGAGCCATGTCCTGCCGCGAGAGATGGCT
CAGGACCCCGGTGATTCGGATGCCCTCGAGACCAGGCCTCCCCGCAAAGCAC
GGAGCAGGACAAGGAGCGCCTGCGTTTCCAGTTCTTAGAGCAGAAGTACGGCT
ACTATCACTGCAAGGACTGCAAAATCCGGTGGGAGAGCGCCTATGTGTGGTGT
GTGCAGGGCACCAGTAAGGTGTTACTTCAAACAGTTCTGCCGAGTGTGTGAGAA
ATCCTACAACCCTTACAGAGTGGAGGACATCACCTGTCAAAGTTGTAAAAGAAC
TAGATGTGCCTGCCCAGTCAGATTTTCGCCACGTGGACCCTAAACGCCCCCATC
GGCAAGACTTGTGTGGGAGATGCAAGGACAAACGCCTGTCCTGCGACAGCAC
CTTCAGCTTCAAATACATCATTTAGTGAGAGTCGAAAACGTTTCTGCTAGATGG
GGCTAATGGAATGGACAAGTGAGCTTTCTCCCCTCTTCACCTCTTCCCTTTCCAA
ATTCTTCATGACAGACAGTGTTACTTGGATATAAAGCCTGTGAATAAAAGGTAT
TGCAAACAAAAAAAAAAAAAAAAAAAAA”

Figure 1

Amino Acid sequence: 361aa

"MFPASTFHPCPHPYPQATKAGDGWRFGARGCRPAPPSFLPGYRQLMAAEYVDS
HORAQLMALLSRMGPRSVSSRDAAVQVNPRRDASVQCSLGRRTLQPAGCRASPDA
RSGSCQPRGHAGAGRSRPSWQTVAPFSSVTFCGLSSSLEVAGGRQTPTKGEGSPA
SSGTREPEPREVAARKAVPQPRSEEGDVQAAGQAGWEQQPPPEDRNSVAAMQSEP
GSEEPCPAAEMAQDPGDSDAPRDQASPQSTEQDKERLRFQFLEQKYGYHCKDCK
IRWESAYVWCVQGTSKVYFKQFCRVCEKSYNPYRVEDITCQSCKRTRCACPVFR
HVDPKRPHRQDLCGRCKDKRLSCDSTFSFKYII"

Figure 2

01-184 cDNA sequence: 1817bp

GTCACAGCTTTCCCCTGCCCCGAATATGGTGATCTGTCTCCATTGTCCAGATCA
 GGATGATTCTTTAGAAAGATCACAGAGGAATGCTATTCCCCACCCACCCTC
 CAGAACCTGGCAATTCAGAGTCTACTGAGGGATGAGGCCTTGGCCATTTCTG
 CTCTCACGGACCTGCCCCAGAGTCTGTTCCCAGTAATTTTTTGAGGAGGCCTTC
 ACTGATGGATATATAGGGATCTTGAAGGCCATGATACCTGTGTGGCCCTTCCC
 ATACCTTTCTTTAGGAAAGCAGATAAATAATTGCAACCTGGAGACTTTGAAG
 GCTATGCTTGAGGGACTAGATATACTGCTTGCACAAAAGGTTCAAACCAGTA
 GGTGCAAACCTCAGAGTAATTAATTGGAGAGAAGATGACTTGAAGATATGGGC
 TGGATCCCATGAAGGTGAAGGCTTACCAGATTTTCAGGACAGAGAAGCAGCCA
 ATTGAGAACAGTGCTGGCTGTGAGGTGAAGAAAGAATTGAAGGTGACGACT
 GAAGTCCTTCGCATGAAGGGCAGACTTGATGAATCTACCACATACTTGTTGC
 AGTGGGCCCAGCAGAGAAAAGATTCTATTCATCTATTCTGTAGAAAGCTACT
 AATTGAAGGCTTAACCAAAGCCTCAGTGATAGAAATCTTCAAACCTGTACAC
 GCAGACTGTATACAGGAGCTTATCCTAAGATGTATCTGCATAGAAGAGTTGG
 CTTTTCTTAATCCCTACCTGAAACTGATGAAAAGTCTTTTCACACTCACACTA
 GATCACATCATAGGTACCTTCAGTTTGGGTGATTCTGAAAAGCTTGATGAGG
 AGACAATATTCAGCTTGATTTCTCAACTTCCCACACTCCACTGTCTCCAGAAA
 CTCTATGTAAATGATGTCCCTTTTATAAAAGGCAACCTGAAAGAATACCTCAG
 GTGCCTGAAAAAGCCCTTGGAGACACTTTGCATCAGTAACTGTGACCTCTCAC
 AGTCAGACTTGGATTGCCTGCCCTATTGCCTGAATATTTGTGAACTCAAACAT
 CTGCATATTAGTGATATATATTTATGTGATTTACTCCTTGAGCCTCTTGGTTTT
 CTCCTTGAGAGAGTTGGAGATACCCTGAAAACCCTGGAATTGGATTCATGTT
 GTATAGTGGACTTTCAGTTCAGTGCCTTGCTGCCTGCCCTAAGCCAATGTTCT
 CACCTCAGAGAGGTCACCTTCTATGATAATGATGTTTCTCTGCCTTTCTTGAA
 AACAACTTCTACACCACACAGCCCTGCTGAGTCAGCTGATCTATGAGTGTTAC
 CCTGCCCCCTCTAGAGTGCTATGATGACAGTGGTGTAATACTAACACACAGATT
 AGAAAGTTTTTGTCTGAGCTTCTGGATATACTGAGAGCCAAAAGACAGCTC
 CATAGTGTCTCCTTTCAAACAACCAAATGCTCTAAATGTGGTGGGTGCTACAT
 TTATGATCGGCATACCCAATGTTGCCGTTTTGTGGAACCTACTATAAGCTTGAT
 TGTGAAACTGAGAAATAGAAACTTAGTATTGGGGACTGATGAAATCCTAAGT
 GAATGTCCACTGCTAAATGGAGCATGAAAATGTCAATCACCTAAAAGTCTGA
 GATACACAGGAAAGTCAATAACTTCCTCTGAGCTGGTGAATGGATGTTGCAT
 CTGTAGAAAGTATCAAGCACTTGTAGTTTGAATGTGTTACAATAGAAGCACC
 ATTTTATGAGACTGGCCCAATCTGTTGACTGCATACAATAAATCTGTTGACTT
 ATTAAATTTTTTAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

Figure 3

O1-184 amino acid sequence: 426 amino acids

MVICLHCPDQDDSL EEVTEECYSPPTLQNLAIQSLLRDEAL AISALTDLPQSLFP
VIFEEAFTDGYIGILKAMIPVWPFPYLSLGKQINNCNLET LKAMLEGLDILLAQKV
QTSRCKLRVINWREDDLKIWAGSHEGEGLPDFRTEKQPIENSAGCEVKKELKV
TTEVLRMKGR LDESTTYLLQWAQQRKDSIHLFCRKLLIEGLTKASVIEIFKTVHA
DCIQELILRCICIEELAF LNPYLKLMKSLFTLTLDHIIGTFSLGDSEKLDEETIFSLIS
QLPTLHCLQKLYVNDVPFIKGNLKEYLRCLKKPLETLCISNCDLSQSDLDCLPYC
LNICELKHLHISDIYLCDLLLEPLGFLLERVGD TLKTELDSCCIVDFQFSALLPAL
SQCSHLREVTFYDNDVSLPFLKTTSTPHSPAESADL

Figure 4

Gene name: O1-236

cDNA sequence: 1019bp

“GCCATATTGAGGACCTGCAGTAGAGGTGGAACCCATGACTGGCAGCGCAAAC
ACAGTGATAACAGCTGAGCTCCAAGCAAGGACCCAGGACCTTGCCTCACCACA
GACATAATCTTTCCCCACAACACCTCCACCAAGCCGCCCTGTAAATCGACATGA
GTCGCCACAGCACCAGCAGCGTGACCGAAACCAAGCAAAAAACATGCTCTGG
GGTAGTGAAGTCAATCAGGAAAAGCAGACTTGCACCTTTAGAGGCCAAGGCCGA
GAAGAAGGACAGCTGTAAACTCTTGCTCAGCACGATCTGCCTGGGGGAGAAAG
CCAAAGAGGAGGTGAACCGTGTGGAAGTCCTCTCCCAGGAAGGCAGAAAACC
ACCAATCACTATTGCTACGCTGAAGGCATCAGTCCTGCCCATGGTCACTGTGTC
AGGTATAGAGCTTTCTCCTCCAGTAACTTTTCGGCTCAGGACTGGCTCAGGACC
TGTGTTCCCTCAGTGGCCTGGAATGTTATGAGACTTCGGACCTGACCTGGGAAG
ATGACGAGGAAGAGGAGGAAGAGGAGGAGGAAGAGGATGAAGATGAGGATG
CAGATATATCGCTAGAGGAGATACCTGTCAAACAAGTCAAAAGGGTGGCTCCC
CAGAAGCAGATGAGCATAGCAAAGAAAAAGAAGGTGGAAAAAGAAGAGGATG
AAACAGTAGTGAGGCCCAGCCCTCAGGACAAGAGTCCCTGGAAGAAGGAGAA
ATCTACACCCAGAGCAAAGAAGCCAGTGACCAAGAAATGACCTCATCTTAGCAT
CTTCTGCGTCCAAGGCAGGATGTCCAGCAGCTGTGTTTTTGGTGCAGGTGTCCA
GCCCCACCACCCTAGTCTGAATGTAATAAGGTGGTGTGGCTGTAACCCTGTAAC
CCAGCCCTCCAGTTTCCGGAGGTTTTTGGTGAAGAGCCCCCAGCAAGTTCGCC
TAGGGCCACAATAAAATTTGCATGATCAGGAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAA”

Figure 5

Amino Acid sequence: 207aa

“MSRHSTSSVTETTAKNMLWGSELNQEKQTCTFRGQGEKKDSCKLLLSTICLGEK
AKEEVNRVEVLSQEGRKPPITIATLKASVLPMTVSGIELSPVTFRLRTGSGPVFLS
GLECYETSDLTWEDDEEEEEEEEEDEDEDADISLEEIPVKQVKRVAPQKQMSIAKK
KKVEKEEDET VVRPS PQDKSPWKKEKSTPRAKKPVTKK”

Figure 6

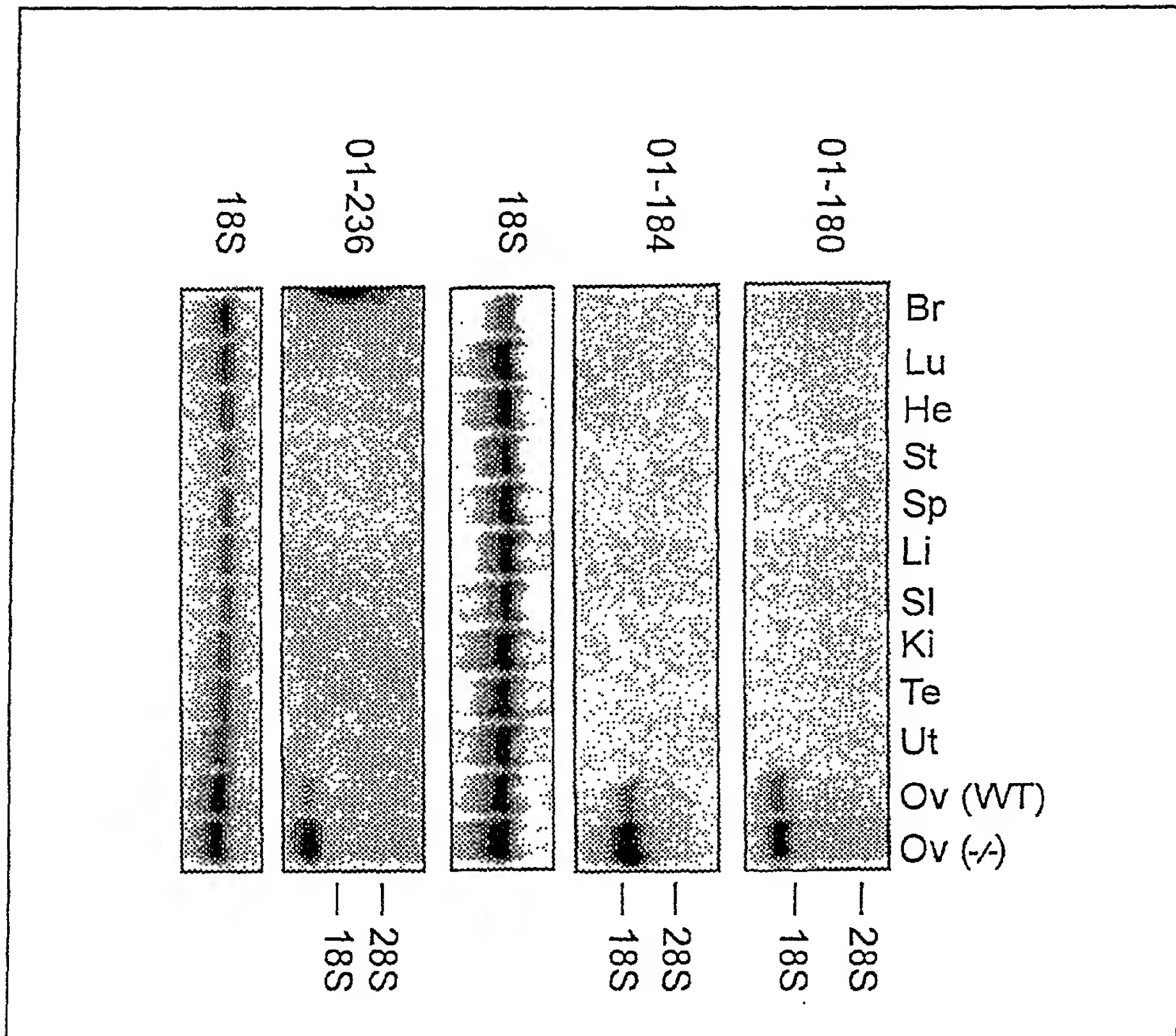


Figure 7

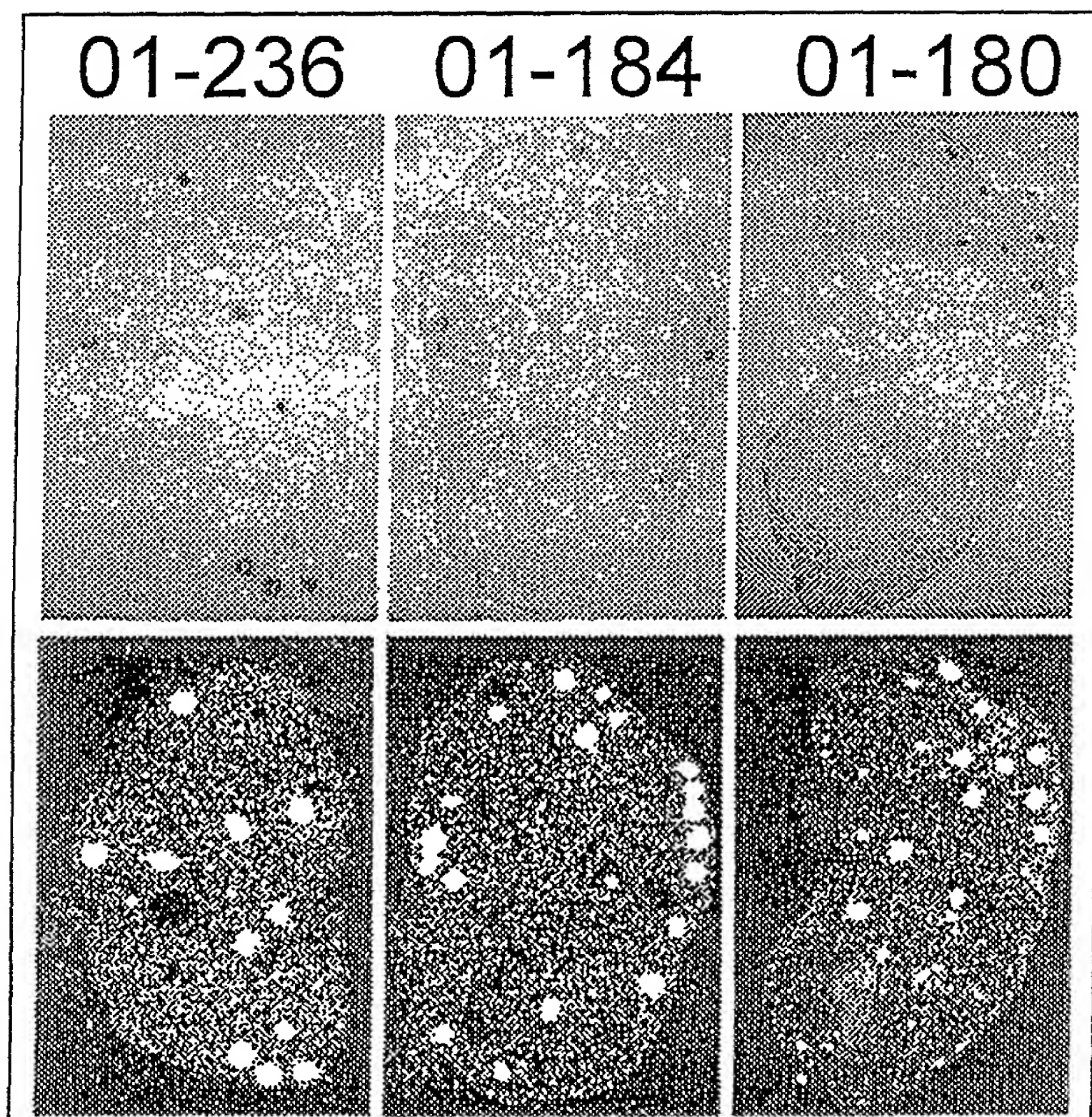


Figure 8

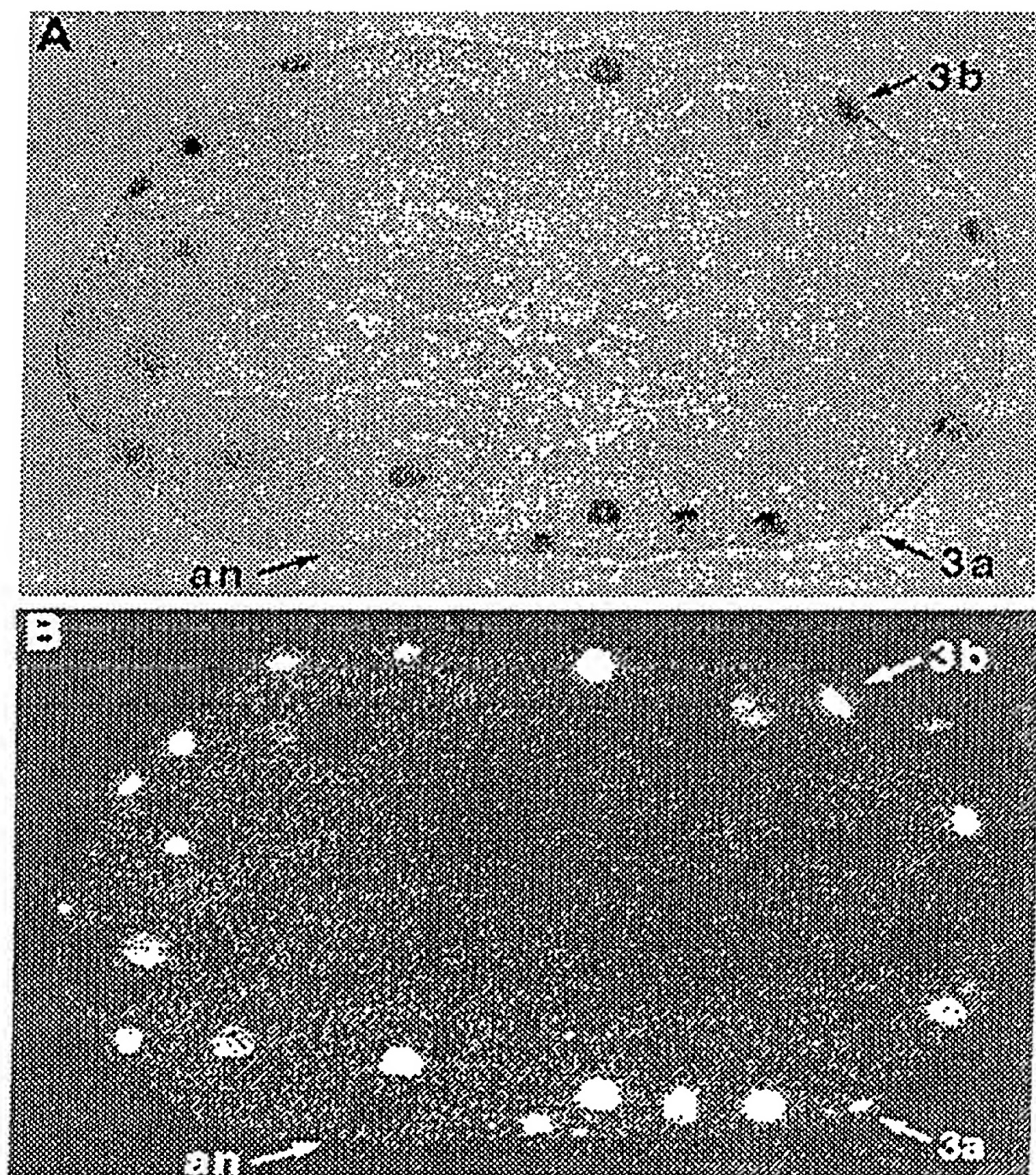


Figure 9

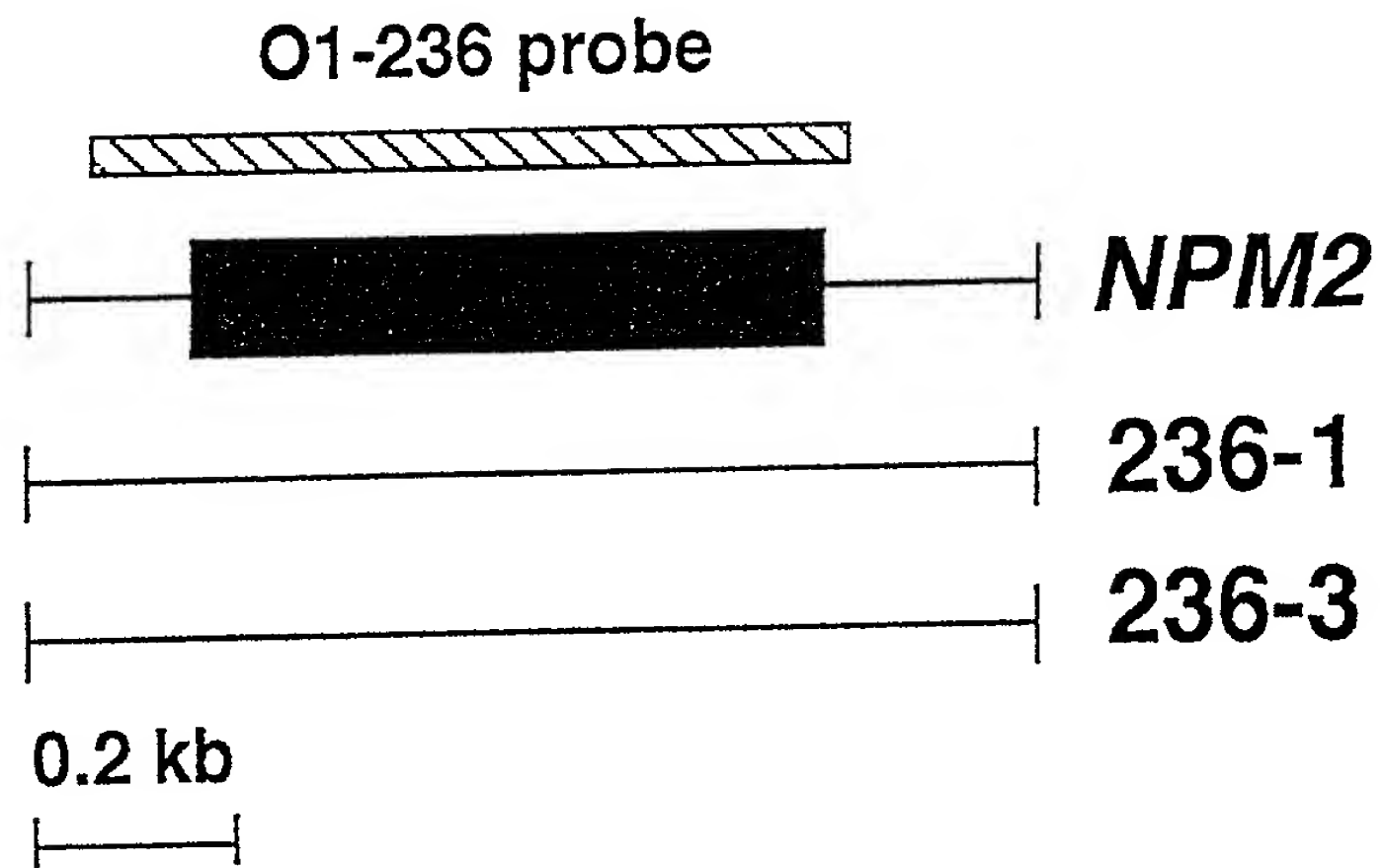


Figure 10

```

196  STPRAKKPVTKK      207
    .. |..|||..||
189  GAGRGRKPAACK      200

```

Figure 11

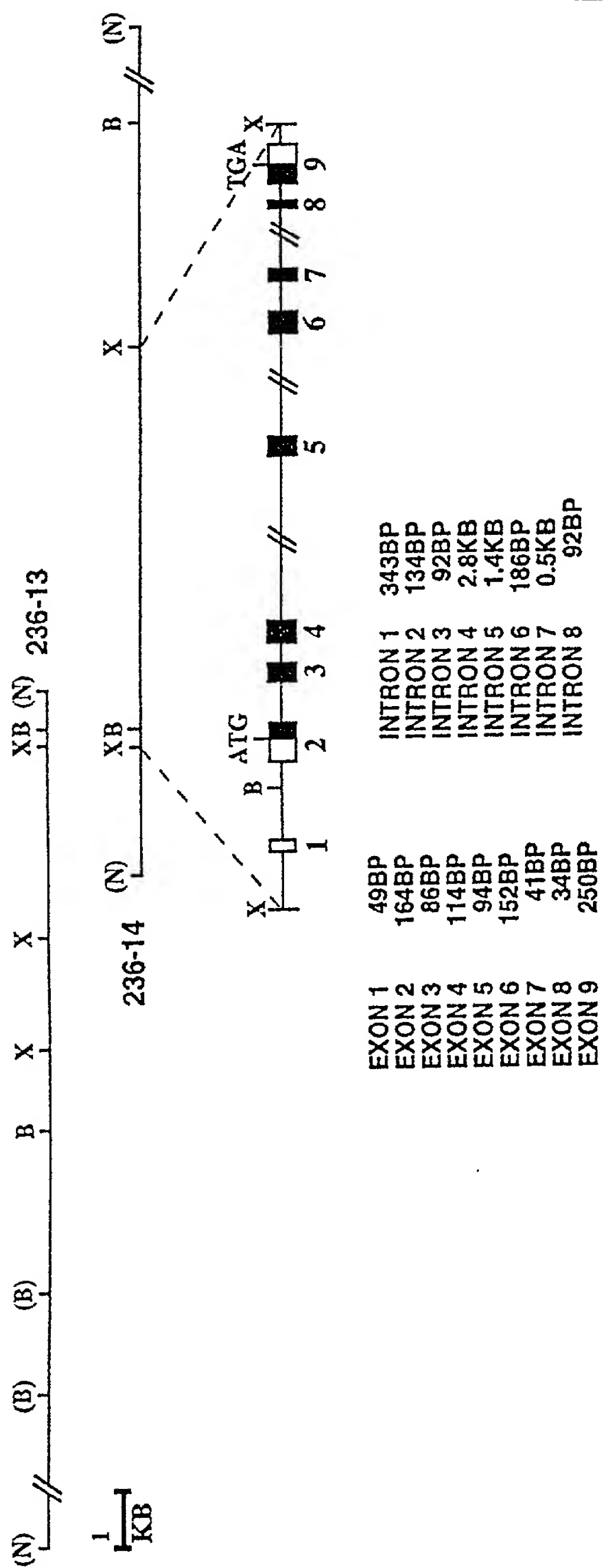


Figure 12

1 M S R H S

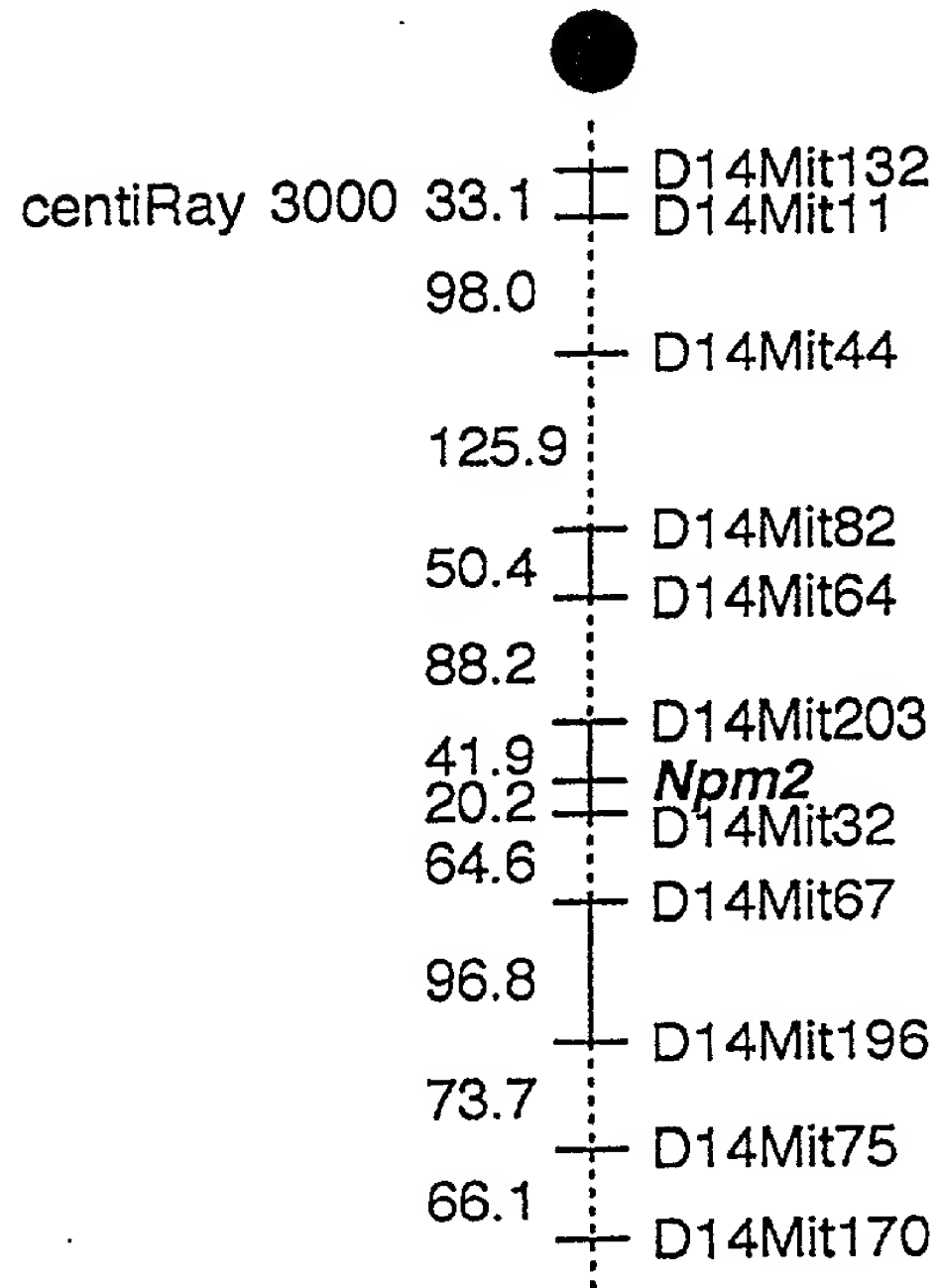
5 CCT CCA GTA ACT TTT CGG CTC AGG ACT GGC TCA GGA
P P V T F R L R T G S G

Figure 13A

108 CCT GTG TTC CTC AGT GGC CTG GAA TGT TAT Ggtaagtt
 P V F L S G L E C Y
 gtagccta... intron 5 = 1.35kb ...ggctacccattcc
 118 agAG ACT TCG GAC CTG ACC TGG GAA GAT GAC GAG GAA
 E T S D L T W E D D E E
 130 GAG GAG GAA GAG GAG GAG GAA GAG GAT GAA GAT GAG
 E E E E E E E E D E D E
 142 GAT GCA GAT ATA TCG CTA GAG GAG ATA CCT GTC AAA
 D A D I S L E E I P V K
 154 CAA GTC AAA AGG GTG GCT CCC CAG AAG CAG ATG AGC
 Q V K R V A P Q K Q M S
 166 ATA GCA AAGgtggggggaaaagaa... intron 6 = 186bp
 I A K
 169 ...tggttttgtccagAAA AAG AAG GTG GAA AAA GAA
 K K K V E K E
 176 GAG GAT GAA ACA GTA GTG AGgtaattcatgcagtt...
 E D E T V V R
 183 intron 7 = 0.5kb ... ctattcccttccagG CCC AGC
 P S
 185 CCT CAG GAC AAG AGT CCC TGG AAG AAG gtgagcaataag
 P Q D K S P W K K
 194 aag... intron 8 = 92bp ...ctcttatctgcacagGAG
 E
 195 AAA TCT ACA CCC AGA GCA AAG AAG CCA GTG ACC AAG
 K S T P R A K K P V T K
 207 AAA TGA CCTCATCTTAGCATCTTCTGCGTCCAAGGCAGGATGTCCA
 K *
 GCAGCTGTGTTCTGGTGCAGGTGTCCAGCCCCACCACCCTAGTCTGAA
 TGTAATAAGGTGGTGTGGCTGTAACCCTGTAACCCAGCCCTCCAGTTT
 CCGGAGGTTTTTGGTGAAGAGCCCCCAGCAAGTTCGCCTAGGGCCACA
 ATAAAATTTGCATGATCAGGacctccctctgcctccccctccctggat
 ggggtctctcgctgctgcgatagctcatgtgccagcagaggggcaacc
 acgagcaagaaaccagcccatgt

Figure 13B

T31 RH Chr 14



Haplotypes for T31 Chr 14 near Npm2

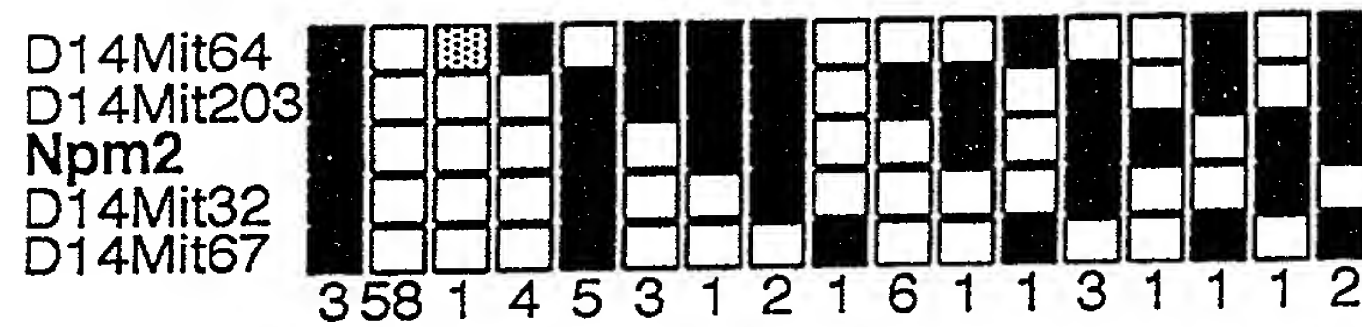


Figure 14

hNPM2	M	N	L	S	S	A	S	S	T	E	E	K	A	V	T	V	L	W	G	C	E	L	S	Q	E	R	R	T	W	T	F	R	P	Q	L	E	G	K	Q	40	
mNpm2	M	S	R	H	S	T	S	S	V	T	E	T	A	K	N	M	L	W	G	S	E	L	N	Q	E	K	Q	T	C	T	F	R	G	Q	G	E	K	K	D	40	
xNpm2	M	A	S	T	V	S	N	T	S	K	L	E	K	P	V	S	L	I	W	G	C	E	L	N	E	Q	D	K	T	F	E	F	K	V	E	-	D	D	E	E	39
hNPM2	S	C	-	-	R	L	L	L	H	T	I	C	L	G	E	K	A	K	E	E	M	H	R	V	E	I	L	P	P	A	N	Q	E	D	K	K	M	Q	P	V	78
mNpm2	S	C	-	-	K	L	L	L	S	T	I	C	L	G	E	K	A	K	E	E	V	N	R	V	E	V	L	S	-	-	-	Q	E	G	R	K	-	P	P	I	74
xNpm2	K	C	E	H	Q	L	A	L	R	T	V	C	L	G	D	K	A	K	D	E	F	N	I	V	E	I	V	T	Q	E	E	G	A	E	K	S	V	P	-	-	77
hNPM2	T	I	A	S	L	Q	A	S	V	L	P	M	V	S	M	V	G	V	Q	L	S	P	P	V	T	F	Q	L	R	A	G	S	G	P	V	F	L	S	G	Q	118
mNpm2	T	I	A	T	L	K	A	S	V	L	P	M	V	T	V	S	G	I	E	L	S	P	P	V	T	F	R	L	R	T	G	S	G	P	V	F	L	S	G	L	114
xNpm2	-	I	A	T	L	K	P	S	I	L	P	M	A	T	M	V	G	I	E	L	T	P	P	V	T	F	R	L	K	A	G	S	G	P	L	Y	I	S	G	Q	116
hNPM2	E	R	Y	E	A	S	D	L	T	W	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	Q	158
mNpm2	E	C	Y	E	T	S	D	L	T	W	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	-	149	
xNpm2	H	V	A	M	E	E	D	Y	S	W	A	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	-	149	
hNPM2	S	P	V	K	Q	V	K	R	L	V	P	Q	K	Q	A	S	V	A	K	K	K	K	L	E	K	E	E	E	E	-	-	I	R	A	S	V	R	D	K	S	196
mNpm2	I	P	V	K	Q	V	K	R	V	A	P	Q	K	Q	M	S	I	A	K	K	K	K	V	E	K	E	E	D	E	T	V	R	P	S	P	Q	D	K	S	189	
xNpm2	-	P	P	K	A	V	K	R	P	A	A	T	K	K	A	G	Q	A	K	K	K	L	D	K	E	D	E	-	-	-	-	-	-	-	-	-	-	-	-	182	
hNPM2	P	V	K	K	A	K	A	T	A	R	A	K	K	P	G	F	K	K	CK2												214										
mNpm2	P	W	K	K	E	K	S	T	P	R	A	K	K	P	V	T	K	K													207										
xNpm2	P	T	K	K	G	K	G	A	G	R	G	R	K	P	A	A	K	K													200										

FIGURE 15

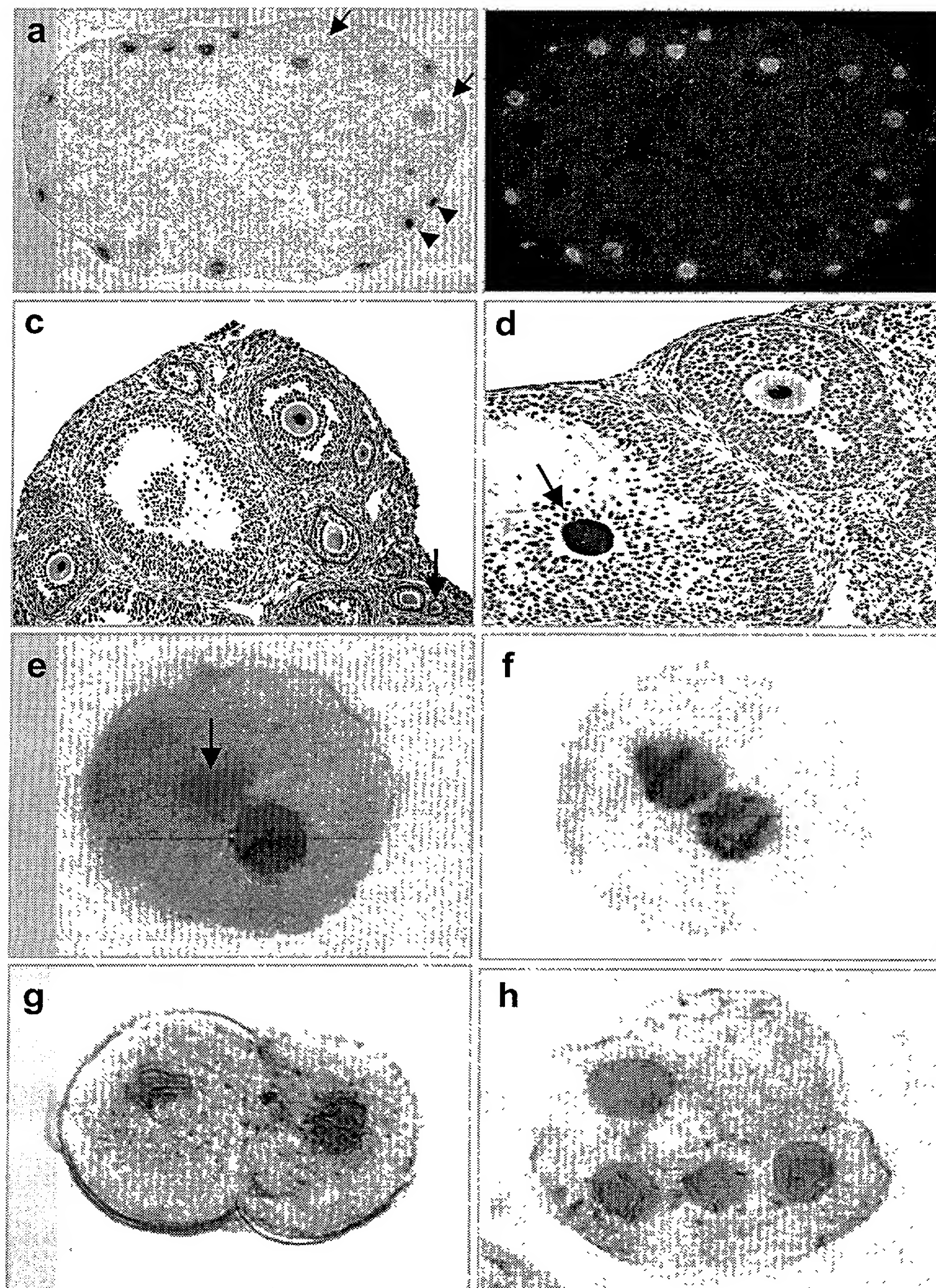


FIGURE 16

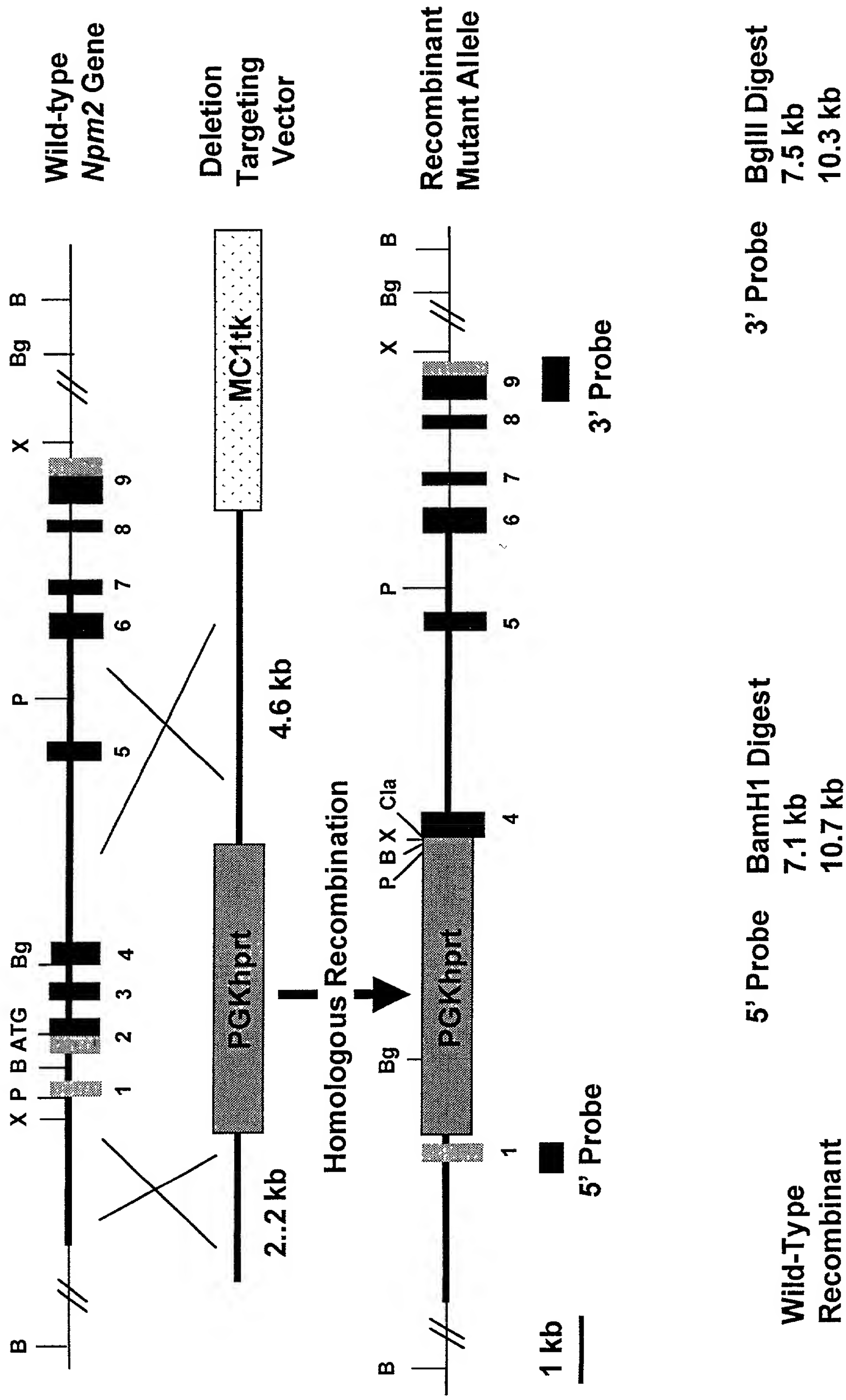


FIGURE 17a

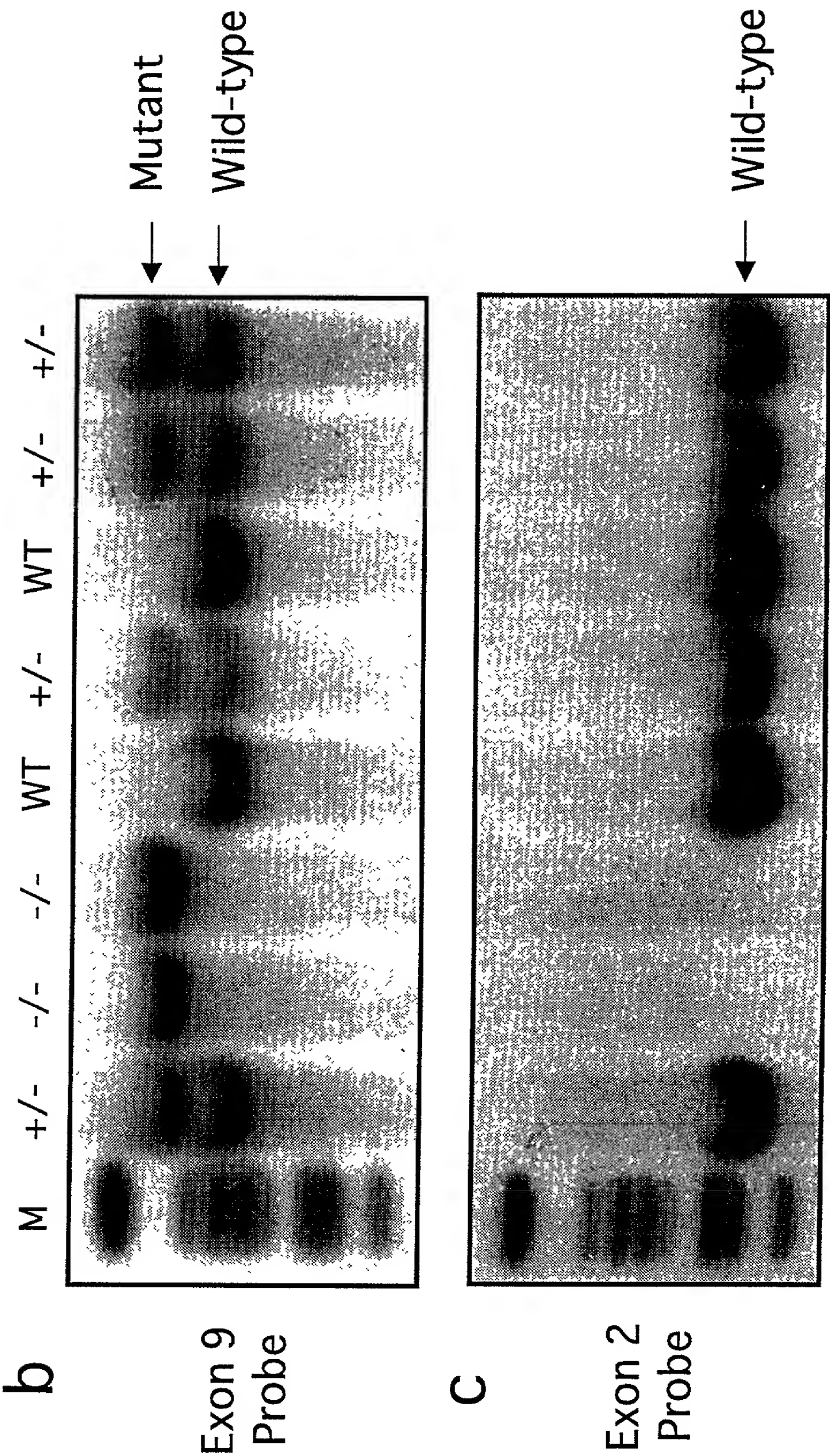


Figure 17b - Figure 17c

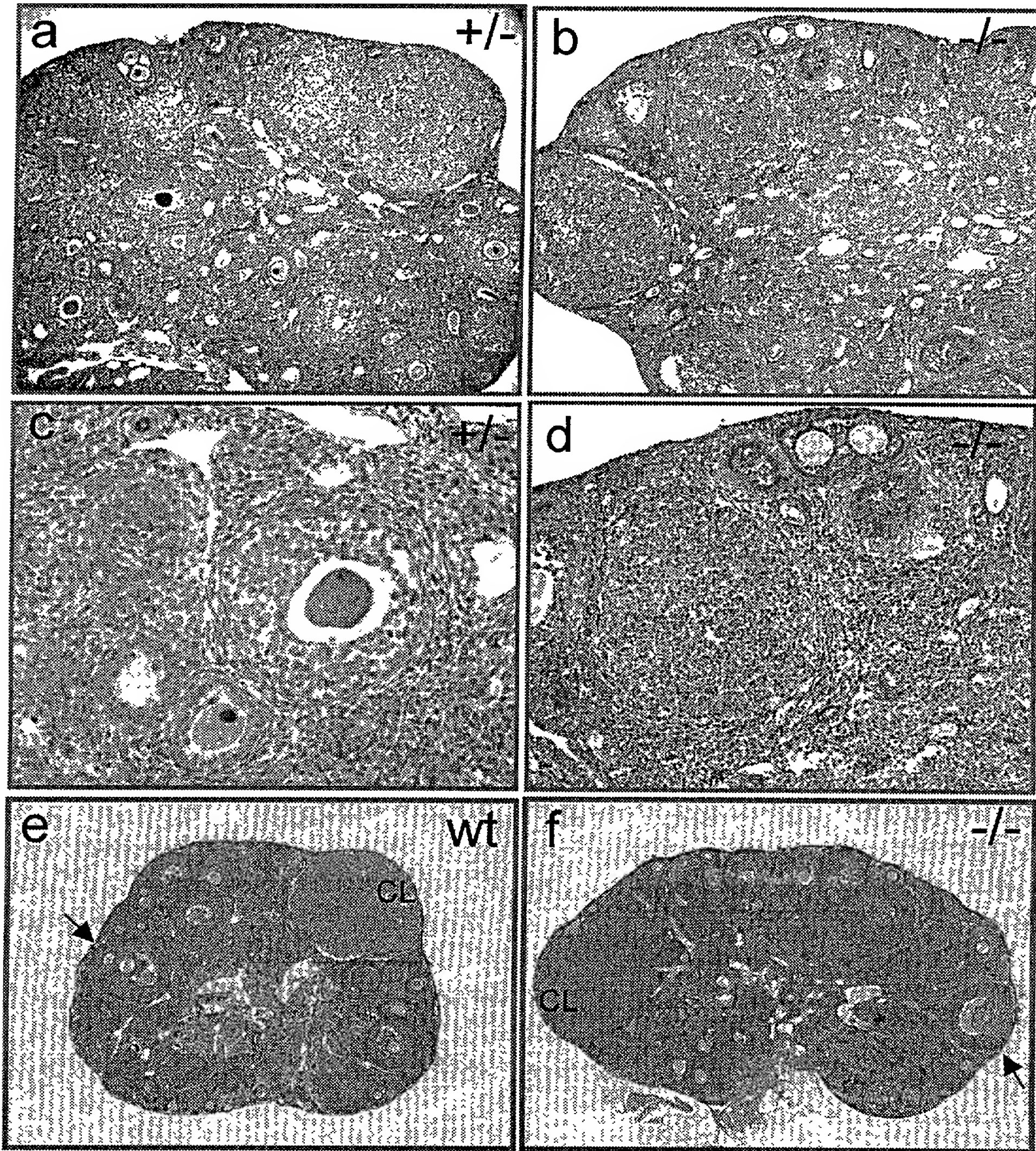


Figure 18

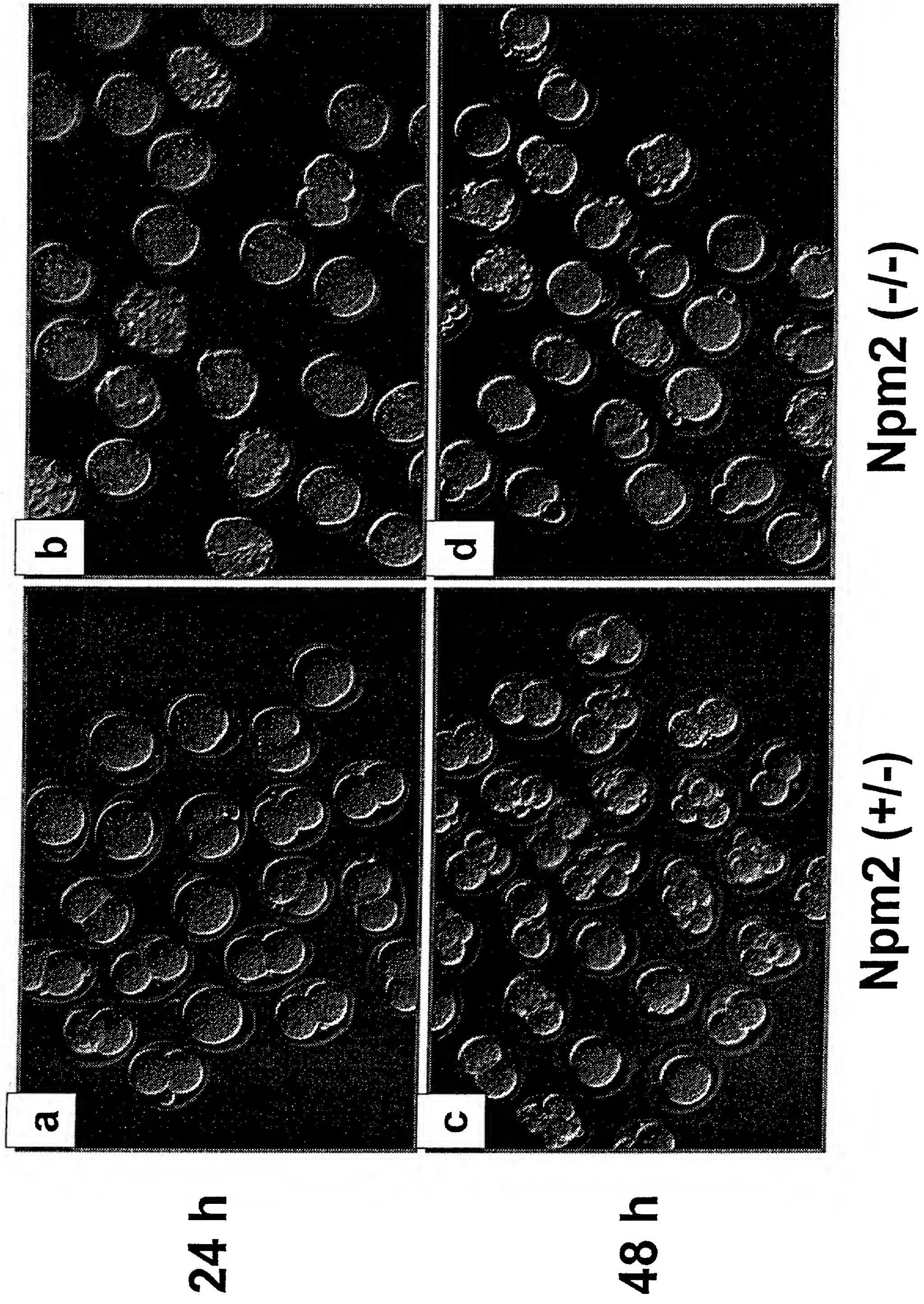


Figure 19a - 19d

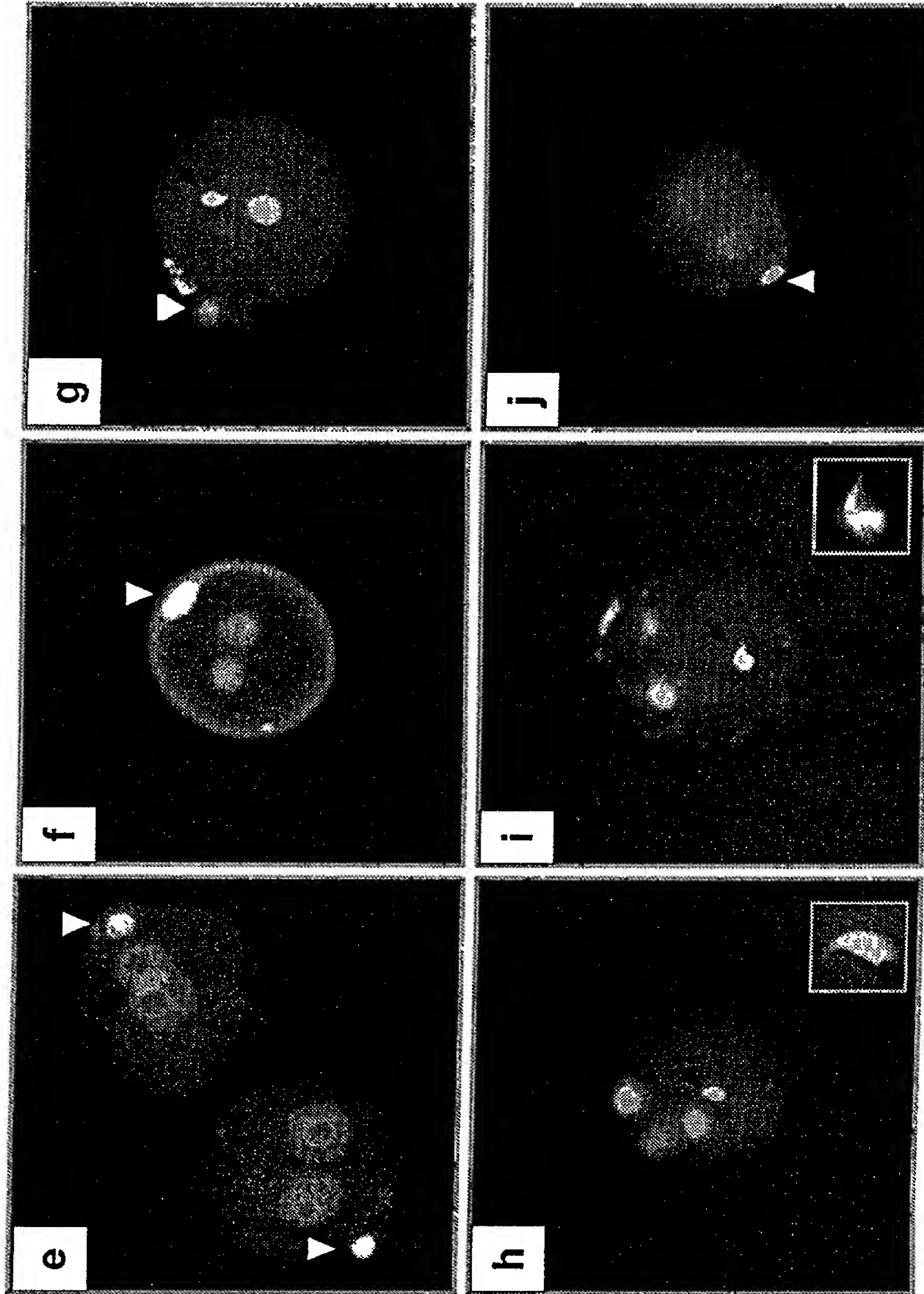


Figure 19e - 19j

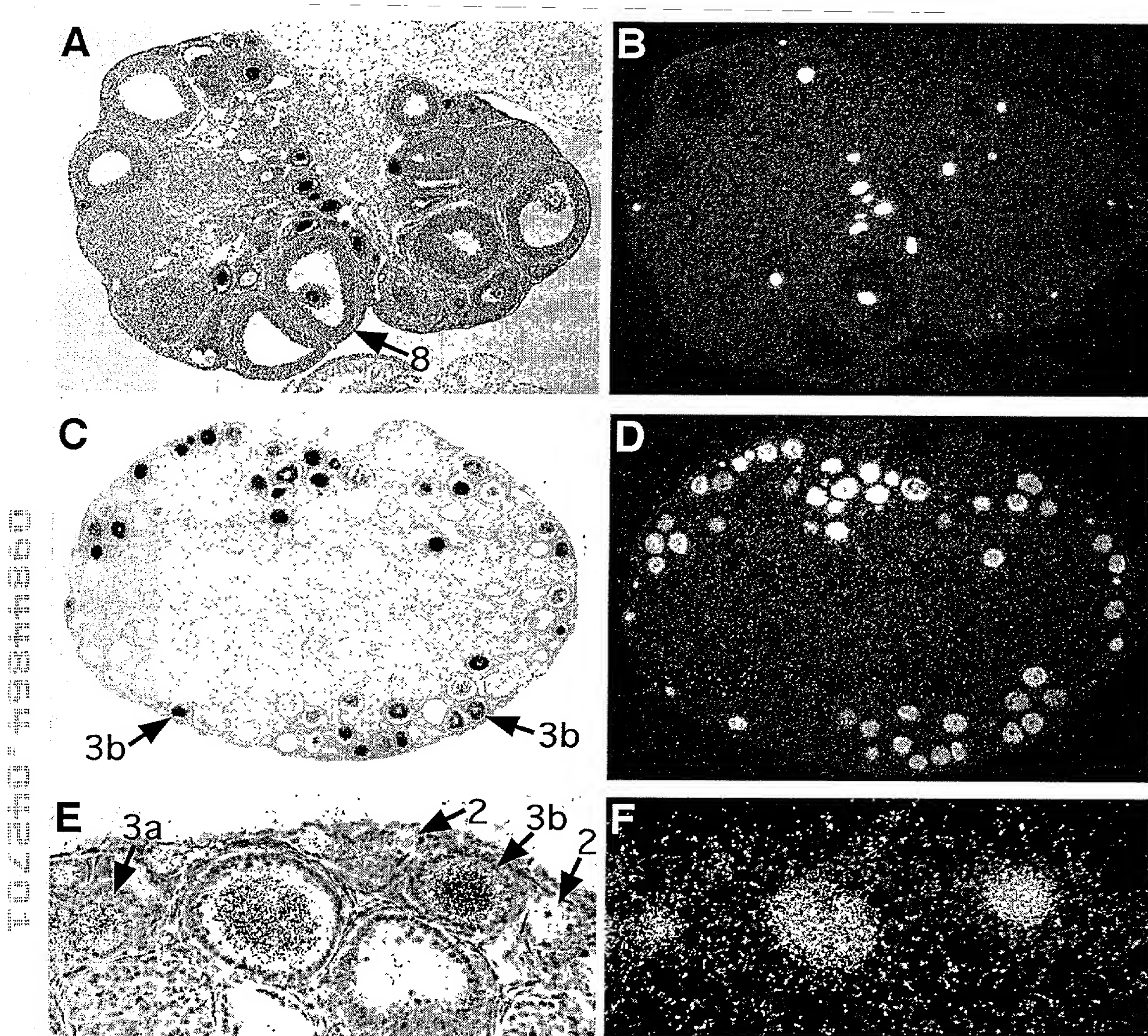


Figure 20

Oo1ps:

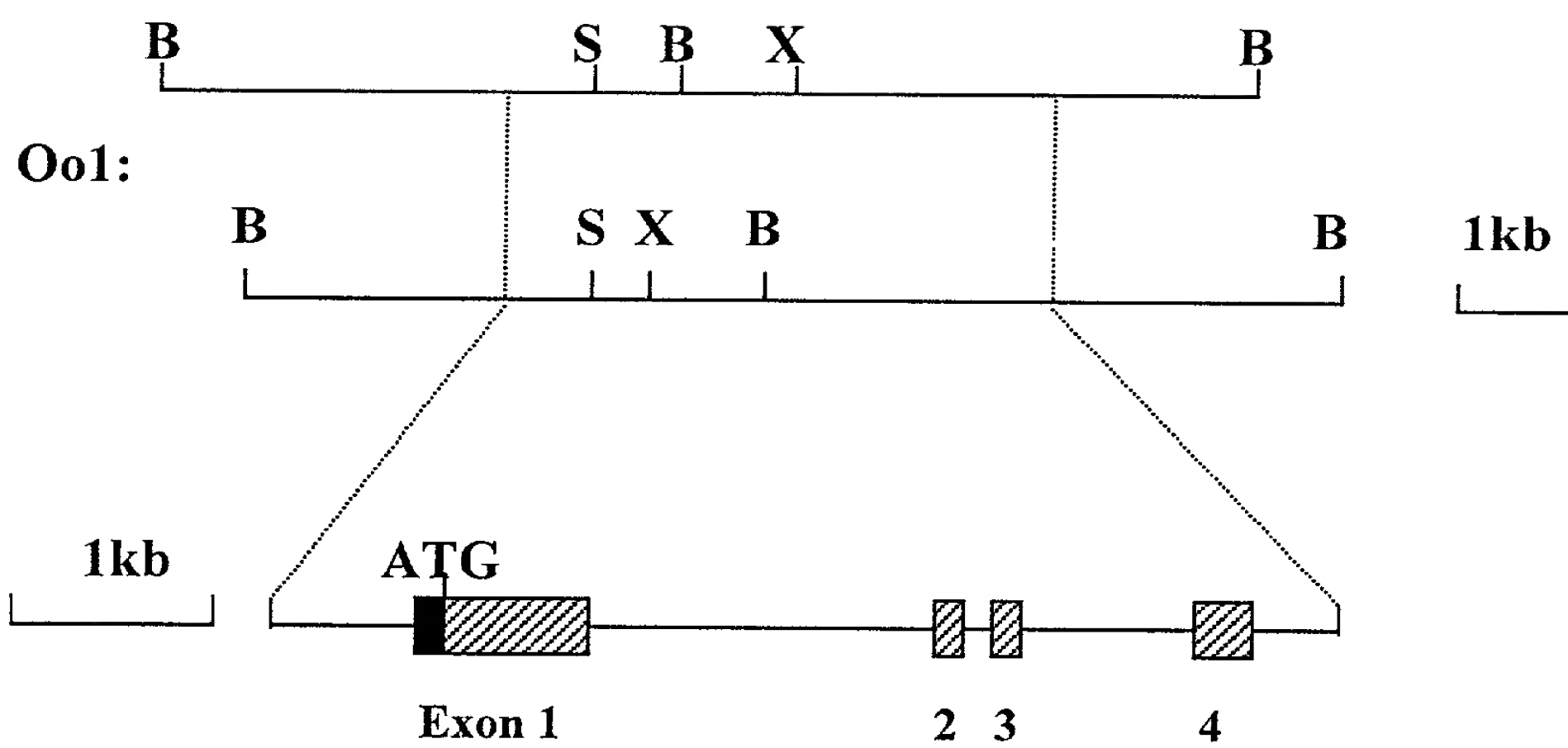


Figure 21

Oo1	gene	GGCGGGCGAGGCGCGGGACGCACCC ATG TTCCCGGCGAGCACGTTCCACCCCTGCCCGCATCCTTATCCG	70
psOo1	gene	GGCGGGCGAGGCGCGGGACGCACCCATGTTCCCGGCGAGCACGTTCCACCCCTGCCCGCATCCTTATCCG	
Oo1	gene	CAGGCCACCAAGCCGGGGATGGCTGGAGGTTCCGAGCCAGGGGCTGCCGACCCGCGCCCCCTCCTTCC	140
psOo1	gene	CAGGCCACCAAGCCGGGGATGGCTGGAGGTTCCGAGCCAGGGGCTGCCGACCCGCGCCCCCTCCTTCC	
Oo1	gene	TCCCCGGCTACAGACAGCTCATGGCCGCGGAGTACGTCGACAGCCACCAGCGGGCACAGCTCATGGCCCT	210
psOo1	gene	TCCCCGGCTACAGACAGCTCATGGCCGCGGAGTACGTCGACAGCCACCAGCGGGCACAGCTCATGGCCCT	
Oo1	gene	GCTGTCCGCGATGGGTCCCCGGTCCGTCAGCAGCCGTGACGCTGCCGCTGCAGGTGAACCCGCGCCGCGAC	280
psOo1	gene	GCTGTCCGCGATGGGTCCCCGGTCCGTCAGCAGCCGTGACGCTGCCGCTGCAGGTGAACCCGCGCCGCGAC	
Oo1	gene	GCCTCGGTGCAGTGTTCACCTCGGGCGCCGCACGCTGCAGCCTGCAGGGTGCCGAGCCAGCCCCGACGCCC	350
psOo1	gene	GCCTCGGTGCAGTGTTCACCTCGGGCGCCGCACGCTGCAGCCTGCAGGGTGCCGAGCCAGCCCCGACGCCC	
Oo1	gene	GATCGGGTTCCCTGTCAACCCCGTGGCCACGCCGGCGCCGGGAGATCCCCCGGATCCTGGCAGACCGTAGC	420
psOo1	gene	GGTCCGGTTCCCTGTCAACCCCGTGGCCACGCCGGCGCCGGGAGATCCCCCGGATCCTGGCAGACCGTAGC	
Oo1	gene	CCCGTTCTCGTCCGTGACCTTCTGTGGCCTCTCCTCCTCACTGGAGGTTGCCGGAGGCAGGCAGACACCC	490
psOo1	gene	CCCGTTCTCGTCCGTGACCTTCTGTGGCCTCTCCTCCTCACTGGAGGTTGCCGGAGGCAGGCAGACACCC	
Oo1	gene	ACGAAGGGAGAGGGGAGCCCGGCATCCTCGGGGACCCGGGAACCGGAGCCGAGAGAGGTGGCCGCGAGGA	560
psOo1	gene	ACGAAGGGAGAGGGGAGCCCGGCATCCTCGGGGACCCGGGAACCGGAGCCGAGAGAGGTGGCCGCGAGGA	
Oo1	gene	AAGCGGTCCCCCAGCCGCGAAGCGAGGAGGGCGATGTTCAAGCTGCAGGGCAGGCCGGGTGGGAGCAGCA	630
psOo1	gene	AAGCGGTCCCCCAGCCGCGAAGCGAGGAGGGCGACGTTCAAGCTGCAGGGCAGGCCGGGTGGGAGCAGCA	
Oo1	gene	GCCACCACCGGAGGACCGGAACAGTGTGGCGGCGATGCAGTCTGAGCCTGGGAGCGAGGAGCCATGTCTCT	700
psOo1	gene	GCCACCACCGGAGGACCGGAACAGTGTGGCGGCGATGCAGTCTGAGCCTGGGAGCGAGGAGCCATGTCTCT	
Oo1	gene	GCCGCAGAGATGGCTCAGGACCCCGGTGATTTCGGATGCCCTCAGAGACAGGCCTCCCCGCAAAGCACGG	770
psOo1	gene	GCCGCAGAGATGGCTCAGGACCCCGGTGATTTCGGATGCCCTC-----CCCCGCAAAGCACCA	
Oo1	gene	AGCAGGACAAGGAGCGCTGCGTTTCCAGgtgaggccagcctga...intron 1 (1.8kb)... taccctgc	799
psOo1	gene	AGCAGGACAAGGAGCTCCTGCGTTTCCAGgtgaggccagcctgg...intron 1 (1.8kb)... taccctgc	
Oo1	gene	tggtcagTTCTTAGAGCAGAAGTACGGCTACTATCACTGCAAGGACTGCAAAATCCGGTGGGAGAGCGCCT	863
psOo1	gene	tggtcagTTCTTAGAGCAGAAGTACGGCTACTATCACTGCAAGGACTGCAAAATCCGGTGGGAGAGCGCCT	
Oo1	gene	ATGTGTGGTGTGTGCAGGGCACCAGTAAGgtaagagacaccgtg...intron 2 (78bp)... tctttctcct	892
psOo1	gene	ATGTGTGGTGTGTGCAGGGCACCAGTAAGgtaagagacaccgtg...intron 2 (78bp)... tctttctcct	
Oo1	gene	cgcagGTGTACTTCAAACAGTTCTGCCGAGTGTGTGAGAAATCCTACAACCCTTACAGAGTGGAGGACAT	957
psOo1	gene	cgtag GTGTACTTCAAACAGTTCTGCCGAGTGTGTGAGAAATCCTACAACCCTTACAGAGTGGAGGACGT	
Oo1	gene	CACCTGTCAAgtaaaccacggtt...intron 3 (878bp)...actccgatttttcagAGTTGTAAAGGAAGT	982
psOo1	gene	CACCTGTCAAgtaaaccacggtt...intron 3 (878bp)...gctctgagttttcagAGTTGTAAAGGAAGT	

Figure 22a

Oo1 gene AGATGTGCCTGCCCAGTCAGACITCGCCACGTGGACCCTAAACGCCCCCATCGGCAAGACTTGTGTGGGA 1052
psOo1 gene AGATGTGCCTGCCCAGTCAGACCTCGCCACGTGTACCTTAGACGCCCCCATCGGCAAGACTTGTGTGAGA

Oo1 gene GATGCAAGGACAAA TGCTTGTCCTGCGACAGCACCTTCAGCTTCAAATACATCATTTAGTGAGAGTAGGA 1122
psOo1 gene GATGCAAGGACAAA CGCCTGTCCTGCGACAGCACCGTCAGCTTCAAATACATGATTTAGTGAGAGTCGAA

Oo1 gene AACGTTTCTGCTAGATGGGGCTAATGGAATGGACAAGTGAGCTTCTCCCCCTCTTCCCTCTTCCCAATTC 1192
psOo1 gene AACGTTTCTGCTAGATGGGGCTAATGGAATGGACAAGTGAGCTTCTCCCCCTCTTCACTCTTCCCTTTC

Oo1 gene CAAATTCCTTCATGACAGACAGTGTACTTGGATATAAAGCCTGTGAATAAAAGGTATTGCAAACA 1257
psOo1 gene CAAATTCCTTCATGACAGACAGTGTACTTGGATATAAAGCCTGTGAATAAAAGGTATTGCAAACA

Figure 22b

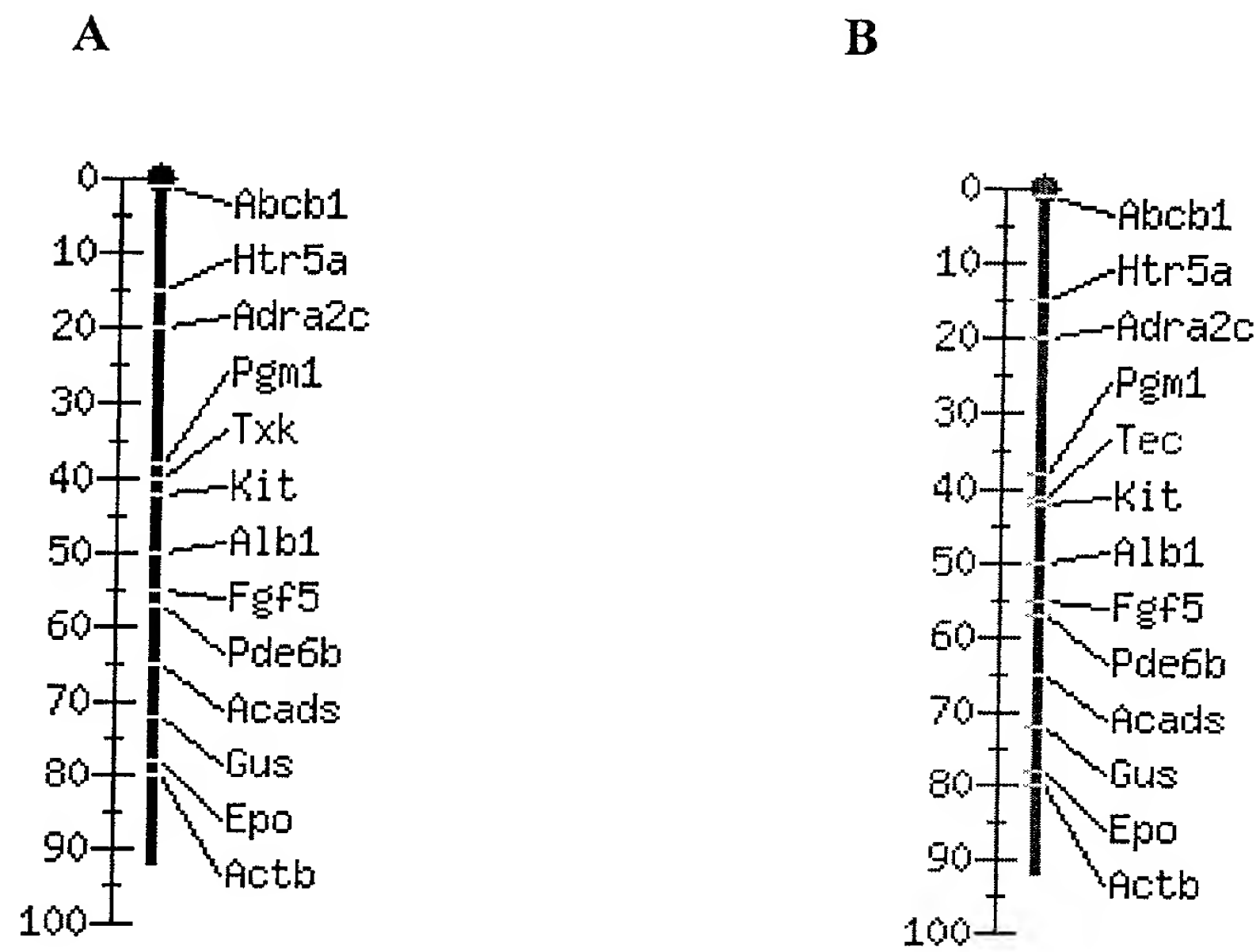


Figure 23

Oo1 Gene Targeting Strategy

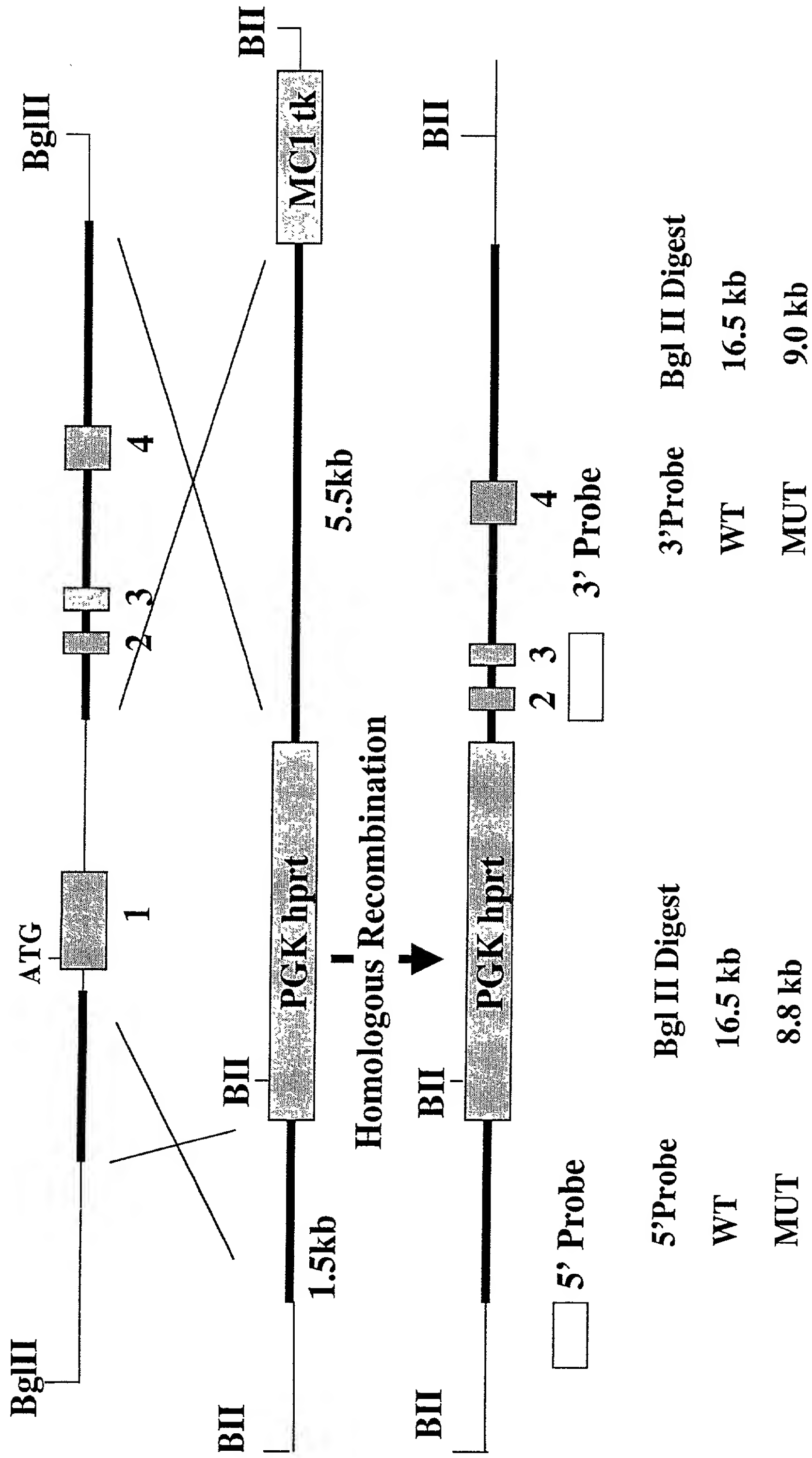


Figure 24

Human NPM2 cDNA sequence: 924bp

CAGCCCGCTT CTCTGCCCCG AGCCATGAAT CTCAGTAGCG
 CCAGTAGCAC GGAGGAAAAG GCAGTGACGA CCGTGCTCTG
 GGGCTGCGAG CTCAGTCAGG AGAGGCGGAC TTGGACCTTC
 AGACCCCAGC TGGAGGGGAA GCAGAGCTGC AGGCTGTTGC
 TTCATACGAT TTGCTTGGGG GAGAAAGCCA AAGAGGAGAT
 GCATCGCGTG GAGATCCTGC CCCAGCAAA CCAGGAGGAC
 AAGAAGATGC AGCCGGTCAC CATTGCCTCA CTCCAGGCCT
 CAGTCCTCCC CATGGTCTCC ATGGTAGGAG TGCAGCTTTC
 TCCCCCAGTT ACTTTCCAGC TCCGGGCTGG CTCAGGACCC
 GTGTTCTCA GTGGCCAGGA ACGTTATGAA GCATCAGACC
 TAACCTGGGA GGAGGAGGAG GAAGAAGAAG GGGAGGAGGA
 GGAAGAGGAA GAGGAAGATG ATGAGGATGA GGATGCAGAT
 ATATCTCTGG AGGAGCAAAG CCCTGTCAAA CAAGTCAAAA
 GGCTGGTGCC CCAGAAGCAG GCGAGCGTGG CTAAGAAAAA
 AAAGCTGGAA AAAGAAGAAG AGGAAATAAG AGCCAGCGTT
 AGAGACAAGA GCCCTGTGAA AAAGGCCAAA GCCACAGCCA
 GAGCCAAGAA GCCAGGATTC AAGAAATGAG GAGCCACGCC
 TTGGGGGGCA CGGTGCAAAG TGGGCCTTCC CTGGGCTGTG
 CTGCAGGCAC AGGGTGCCCC TGTCCAGCCC CTCCACCTGT
 GTCTGAATGC AACAGGGGTG TTGCGGGGGC AACATGAGAG
 CCCCTCACCC CCAACTCTCC ACTTTCAGGA GGCCCCCAGT
 GAAGAGCCCC ACCTCGGGGT CACAATAAAG TTGCCTGGTC
 AGGAAAAAAA AAAAAAAAAA AACGTTTGCG GCCGCAAGCT
 TATG

Human NPM2 Amino Acid sequence: 214aa

MNLSSASSTE EKA VTTVLWG CELSQERRTW TFRPQLEGKQ
 SCRLLLHTIC LGEKAKEEMH RVEILPPANQ EDKKMQPVTI
 ASLQASVLPM VSMVGVQLSP PVTFQLRAGS GPVFLSGQER
 YEASDLTWEE EEEEEGEEEE EEEEEDEDED ADISLEEQSP
 VKQVKRLVPQ KQASVAKKKK LEKEEEEIRA SVRDKSPVKK
 AKATARAKKP GFKK

Figure 25